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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/542,781  
Filing Date: July 20, 2005  
Appellant(s): DORR, WALTER

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Mark S. Bicks  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed November 7, 2008 and reply brief filed July 14, 2009, appealing from the Office action mailed July 11, 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

On further review, claims 20-24 are allowed; leaving claim 19 objected to and claims 11-18 on appeal.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct, except for the following.

**WITHDRAWN REJECTIONS**

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The 103 rejection of claims 20-24.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

4,644,976	Peter et al	2/1987
6,346,806	Schabuble et al	2/2002
3,636,824	Clark	1/1972

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 11-18 are rejected under 35 U.S.C. § 103 as being unpatentable over Peter et al in view of Schabuble et al, and Clark. Peter et al discloses a piston type device comprising a piston (including 2, 6) of a non-magnetizable material (column 2 line 16-17) axially movable in and dividing a cylindrical tube (1, 5) into a first gas space and a second hydraulic space; wherein the piston has radially smaller (6 surrounded by 8) and larger (2 and 6 not surrounded by 8) circumferential sections spaced from and engaging the tube, forming the gas and hydraulic spaces (column 2 line 49-57), respectively, with a radial shoulder there between; wherein a magnet arrangement (8) is mounted on and about the smaller circumferential section; two sensors (10, 11) positioned on an exterior of the cylindrical tube, which responds to the field generated by the magnets, to determine piston end positions; but does not disclose that the cylindrical tube is made of magnetizable material; that the magnet arrangement includes a plurality of permanent magnets formed as an annular ring (22), mounted between first

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and second ring elements (25, 26) of magnetizable material; wherein the ring elements have an exterior diameter, adjacent the magnets, spaced from the tube, and, more remote from the magnets having a exterior diameter approximating the interior diameter of the tube, and wherein the magnets are mounted at a radial distance from a circumference of the piston, in a row, concentric with a longitudinal axis of the piston, with a same polarity relative to each other so that their polar axis extend parallel to the longitudinal axis; that the sensors are Hall effect sensors; or that a threaded ring engages a threading on the piston to hold the annular rings together on the smaller circumferential section.

Schabuble et al teaches, for a piston type device comprising a piston (27, 28) of a non-magnetizable material (column 4 line 22-23) axially movable in a cylindrical tube (29); a magnet arrangement mounted on the piston and two sensors (21, 21', fig 5, column 2 line 21-22) positioned on an exterior of the cylindrical tube, which responds to the field generated by the magnets, to determine piston position; that the cylindrical tube is made of magnetizable material (column 4 line 14-16); that the magnet arrangement includes a plurality of permanent magnets (23, fig 6) formed as an annular ring (22), mounted between first and second ring elements (25, 26) of magnetizable material; wherein the ring elements have an exterior diameter, adjacent the magnets, spaced from the tube, and, more remote from the magnets having a exterior diameter approximating the interior diameter of the tube, and wherein the magnets are mounted at a radial distance from a circumference of the piston, in a row, concentric with a longitudinal axis

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of the piston, with a same polarity relative to each other so that their polar axis extend parallel to the longitudinal axis; and that the sensors are Hall effect sensors.

Since the magnet arrangement of Peter et al and Schabuble et al are interchangeable in the piston art; it would have been obvious at the time the invention was made to one having ordinary skill in the art to replace the magnet arrangement of Peter et al with a magnet arrangement which includes a plurality of permanent magnets formed as an annular ring (22), mounted between first and second ring elements (25, 26) of magnetizable material; wherein the ring elements have an exterior diameter, adjacent the magnets, spaced from the tube, and, more remote from the magnets having a exterior diameter approximating the interior diameter of the tube, and wherein the magnets are mounted at a radial distance from a circumference of the piston, in a row, concentric with a longitudinal axis of the piston, with a same polarity relative to each other so that their polar axis extend parallel to the longitudinal axis; that the sensors are Hall effect sensors; and that the cylindrical tube is made of magnetizable material, as taught by Schabuble et al, since one having ordinary skill in the art would have been able to carry out such a mounting and the resulting combination would predictable work in the same manner.

Clark teaches, for a piston type device comprising a piston (20, 22, 28) axially movable in a cylindrical tube (16) and having radially smaller and larger circumferential sections (as part of 20) spaced from and engaging the tube, with a radial shoulder there between; with an arrangement mounted on and about the smaller circumferential section; that a threaded ring (28) engages a threading on the piston to hold the arrangement (A) on the smaller circumferential section.

Since the modified Peter et al doesn't give details of how the arrangement is held on the smaller circumferential section and Clark does; it would have been obvious at the time the invention was made to one having ordinary skill in the piston art to wherein a threaded ring engages a threading on the piston to hold the annular rings together on the smaller circumferential section, as taught by Clark, since one having ordinary skill in the art would have been able to carry out such a configuration and the results would be reasonably predictable.

#### **(10) Response to Argument**

Before responding to the issues, the examiner would like to address a question that underlies all of the issues. There appears to be a difference in opinion of who a person of ordinary skill in the accumulator art is. The examiner contends that one of ordinary skill in the accumulator art would understand that the instant invention deals with accumulator pistons, and that there are many similarities between accumulator pistons and pistons that are part of actuators and pumps, and some differences. A similarity between accumulator pistons and actuator pistons includes that they move based on a difference in pressure across the piston. A difference includes the purpose of the movement: accumulator pistons move to absorb fluid from or supply fluid to the rest of the system, whereas actuator pistons move to move another element. One of ordinary skill in the accumulator art would recognize that, when a teaching is related to a similarity between accumulator pistons and actuator pistons, the teaching can be applied to the accumulator piston; whereas when the teaching is related to the

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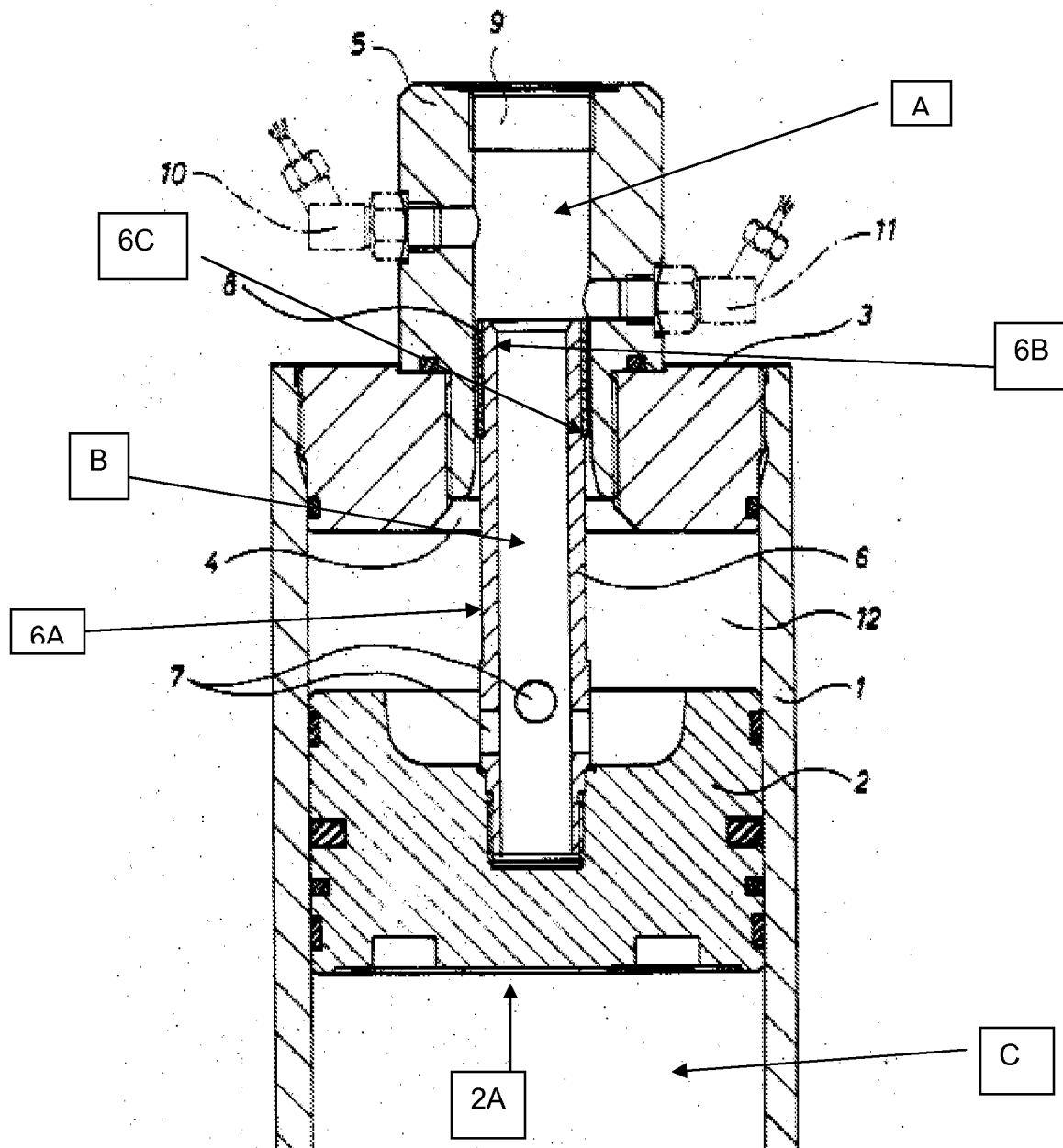
difference, it can not be applied to the accumulator piston. It is also understood that the similarity or difference does not have to be explicitly discussed.

It is suggested that all the teachings in the 103 rejection are teachings related to similarities. The teaching of Schabuble et al is related to a magnetic position sensor, and since the accumulator piston of Peter has a magnetic position sensor, this teaching is related to similarities between the pistons and can be applied to the piston of Peter. Similarly, the teaching of Clark is related to fixing an element to the piston, which is implicitly related to a similarity on the accumulator piston of Peter, which is fixing the magnet on the piston, and therefore is also applicable.

#### I. Peter et al

A. Appellant argues that a piston 2 separates a gas space 12 from a hydraulic space, and a support or piston rod 6 does not. Since the support 6 is not the piston, the Peter et al accumulator does not have a smallest (sic) section opening on a gas space and a larger circumferential section defining an opposite end of the piston facing the fluid space (paragraph bridging pages 6 and 7). The piston rod 6 and piston 2 are separate members that are connected, such that the piston rod can not supply the claim limitations relative to the piston (first full paragraph of page 7). The piston rod 6 is usually outside the housing by being in tube member 5.

Although the pistons and cylinders of the instant application and Peters et al look very differently, the limitations of the piston in the claims have a one to one correspondence with the elements of Peters et al. And therefore, the Examiner disagrees with both of the above characterizations, as discussed below.



The cylinder includes elements 1, 3 and 5. The gas space includes the space marked 12, in larger cylinder member 1, plus the space (A, marked above) inside of smaller cylinder 5 (and the space B, marked above, inside 6). The element 9 of smaller cylinder 5 is threads for engaging a conventional sealing device for a conventional filling



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device (column 2 line 30-33). One of ordinary skill in this art would recognize that the opening formed by the threads would need to be sealed when the accumulator is operated, because the gas space 12 communicates with the space (A) inside 5 via openings 7 and an internal bore (B, marked above) in element 6 of the piston, via space between the switch ring 8 (column 2 line 25-26) and when the switch ring leaves the smaller cylinder member 5 (column 2 line 26-28).

The elements that move inside the cylinder are elements 2 and 6; which broadly speaking are considered the piston, even though they are made of separable elements.

The question is, do these elements meet the limitations of claim 11? The limitations, with corresponding reference numbers from the above drawing in brackets are “an accumulator housing forming a cylindrical tube [1, 3, 5]...having a gas space [A, B, 12] and a hydraulic fluid space [C]...a piston [2, 6] axially movable...in said cylindrical tube and forming a movable separating element separating said spaces in said housing, said piston having radially smaller [6B] and larger [2, 6A] circumferential sections spaced from and engaging said cylindrical tube, respectively, and having a radially extending shoulder surface [6C] extending between said smaller and larger circumferential sections, said smaller circumferential section located on an end of said piston opening on said gas space, said larger circumferential section defining an opposite end [2A] of said piston facing said fluid space” (claim 11 line 2-11).

Appellant appears to be focusing on the section 6A as not being part of the larger circumferential section. Even if this is true (such that the part 6A is an intermediate circumferential section), all of the above limitations are still met by Peters et al.

B. Appellant contends that Peter et al states the switch member 8 can leave tube member 5, but does not specify which way, and regardless, of where the switch member is, the smaller section which it is on, is not on a piston end opening on the gas space (either up or down, in the figure; page 8 first full paragraph). As shown above, the space (A) in the tube member 5 is part of the gas space, and therefore the passage formed by threads 9 must be sealed to prevent gas from escaping from the gas space. With this seal, the switch member 8 can not possibly leave the tube member 5 by going up. Therefore it can only leave by going down and out of the gas space A.

The piston has 2 opposite ends, the end facing down (2A), which faces the hydraulic fluid space, and the end facing up, which faces the gas space. The smaller section (6B) is on the end of the piston which faces up and so faces the gas space; thereby meeting this limitation.

C. Appellant argues that the mounting of the switch ring 8 on the outer surface of the free end of piston rod 6 is not described in detail and the drawing does not clearly provide any details of the attachment, so that the allegation of a smaller section and shoulder is not clear from the patent (paragraph bridging pages 7 and 8).

The examiner disagrees. The drawing clearly shows a switch ring having an inner diameter smaller than an outer diameter of another part of the piston (6A) and an outer diameter larger than the outer diameter of the same part (6A).

D. (from reply brief filed 7/14/09) Appellant argues that the housing 1 and 5 of Peter does not form a cylindrical tube, since the housing is 2 cylinders of different diameters joined together (i.e. a stepped cylinder). Since a cylinder is defined as a

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surface traced by a straight line moving parallel to a fixed straight line and intersecting a fixed planer closed curve (a geometric definition, supplied by Appellant, page 2 line 11-12); a stepped cylinder can not be a cylinder. The examiner agrees that the cylindrical tube must have a shape of a hollow cylinder, but disagrees about what constitutes a cylinder. Although the first definition of cylinder, in Webster's New World Dictionary, Third College Edition, is what Appellant quotes, a second definition is "anything having the shape of a cylinder", and gives the example of the turning part of a revolver. Most cylinders of revolvers would not meet the first definition of cylinder, because they usually have blind grooves that go part way from the front toward the back. In the same way, the stepped cylinder of Peter does not meet the first definition of cylinder, but would meet the second definition, since it has a cylinder shape. Since this is the broadest reasonable interpretation of "cylindrical tube", Peters meets this claim limitation.

E. (from reply brief filed 7/14/09) Appellant argues that the claimed combination requires that the radially extending shoulder surface extend between the larger and smaller circumferential sections, with the larger and smaller circumferential sections located on respective ends of the piston opening on the fluid and gas spaces, respectively. In this way **the shoulder must be axially between the fluid and gas spaces** (page 2 last line – page 34, emphasis added). Since the support member 6 of Peters does not separate the gas and fluid spaces, the support structure can not be relied on to meet the claimed limitations (page 3 line 6-9).

The examiner disagrees. There is no limitation that the shoulder must be axially between the fluid and gas spaces, or must separate these spaces. It would appear that Appellant is adding a limitation that the shoulder is adjacent the larger circumferential section, so that it also separates the gas and fluid spaces. The only limitation on the shoulder is that it be between the larger and smaller circumferential sections, which the piston (2, 6) of Peters has. It is understood that the piston of Peters has another intermediate circumferential section between the shoulder and the large circumferential section, but that is not precluded by the claim limitations. And therefore, the shoulder of Peters meets the claimed limitations.

F. (from reply brief filed 7/14/09) Appellant argues that the grounds of rejection have been modified to now allege that the support member 6 of Peter is part of the piston 2 and that the tube member 5 is part of the housing, which forms part of the gas chamber (page 2 line 2-4). The examiner disagrees. In the final rejection of July 11, 2008, Peter was disclosed as having “a piston (**including** 6)...axially movable and dividing a cylindrical tube (1, 5) into a first gas space and a second hydraulic space” (page 2 line 13-15, emphasis added). Clearly, element 6 is indicated as part of the piston, which also includes another part (e.g. 2); and the housing includes the member 5. Therefore, the grounds of rejection have not been modified.

## II. Peter et al and Schabuble et al

A. Appellant argues that Schabuble et al discloses a device with a movable magnet connected to a piston (27) with a push rod (28). The device is not an accumulator and is not disclosed as having a gas space and a hydraulic fluid space. No

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common problem or environment exists between the 2 patents to support the alleged obviousness of the proposed combination (first full paragraph of page 9).

The examiner disagrees. The environment is common in that both have pistons, fixed to respective magnets, and movably mounted in cylinders. And the problem is the same, using a magnet to generate a magnetic field that can be detected by a sensor. One of ordinary skill would look to the art of Schabuble et al to determine teaching about positions sensors and magnets which can be used to modify the magnet and sensors of Peter et al.

B. Appellant argues that the pole shoes (25, 26) are mounted on an end of the piston opposite the extension of the push rod 28; and the piston has a constant circumference, and so does not have larger and smaller circumferential sections. Even assuming that the combination is appropriate, the magnet structure of Schabuble et al would only be added to the free end of Peter et al, thereby not meeting the claimed limitations (part of the first paragraph and the second paragraph of page 9).

The examiner disagrees. Schabuble et al states that the magnet "is arranged on the piston or on the piston rod" (column 2 line 45-46). Therefore, the mounting of the poles to the piston is only shown schematically. One of ordinary skill in this art would not only understand that the magnet of Schabuble et al can be mounting on the smaller circumferential section of Peter et al, but would need to, so that the sensors (10, 11) of Peter et al would interact with its magnetic field. Therefore, the combination of patents would meet the claimed limitations.

III. Peter et al and Clark

A. Appellant states that Clark discloses a filler ring 20 supporting a unitary assembly A with rings 14a and 14b on a body member 10 mounted on an external annular rabbit 18 and held in place by a nut 28 threaded on end 22a or a reduced end portion of a piston rod 24; and Clark does not disclose a piston with a smaller circumferential section opening onto a gas space, with a magnet arrangement mounted on and about the smaller circumferential section. Appellant concludes that the structure of Peter et al is intended to provide support for piston seals and bearings and does not relate to accumulators; and that there is no analogous environment or common problem between Clark and Peter et al (paragraph bridging pages 9 and 10, and first paragraph of page 10).

The examiner agrees with Appellant's statements, but recognizes that the teaching of Clark is not used to teach mounting a magnet on the smaller circumferential section (Peter et al discloses this). The examiner does not agree with Appellant's conclusion. The teaching of Clark is a general teaching of fixing an arrangement (A) on a smaller circumferential section, against a shoulder formed between the smaller and a larger circumferential section (of 20), for a piston movably mounted in a cylinder. Since the magnet of Peter et al is fixed on a smaller circumferential section against a shoulder between the smaller and a larger circumferential section, the teaching of Clark is pertinent to the accumulator piston of Peter et al.

#### IV. Hindsight reasoning

Appellant argues that there must be something in the teachings that provide a reason that the claimed invention is obvious (last paragraph of page 10); adds “The Examiner, in this situation, has not pointed to any specific principle or motivation in the prior art that would lead one skilled in the art to arrive at the invention as claimed” (page 11 line 13-14), and “The Examiner us using the Examiner’s knowledge of the invention, in hindsight, to conclude improperly that one skilled in the art would have found it obvious to make the proposed modification. However, such hindsight reconstruction is impermissible in reaching a finding of obviousness” (page 11 line 21- page 12 line 1).

It must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

The examiner agrees that there must be something in the teachings of the prior art that provides a reason to combine references. But this reason does not need to be explicit in the references, and does not need to be a specific principle or motivation (understood to be an advantage). In this case, the reason for replacing the magnet arrangement of Peter et al for the magnet arrangement of Schabuble et al, is because they are equivalent magnet arrangements, which is to say that they both generate a magnetic signal that can be sensed by a sensor. There clearly are differences between the 2 arrangements, which

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would result in secondary considerations, such as one may be more costly to make or install, and/or one could generate a more focused signal. One of ordinary skill in this art would recognize that for a particular installation, one of these arrangements would be chosen, based on these secondary considerations, but would also understand that there would always be a choice between these different equivalents.

V. Dependent claims

It would appear that Appellant's arguments concerning the dependent claims are only related to the obviousness of combining the references and not to any special merits of the dependent claims themselves. As these issues have been addressed above, the examiner feels that these issues do not need to be revisited. It would appear that since the issues for the dependent claims are the same as for the independent claim, the claims stand and fall together.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/F. DANIEL LOPEZ/  
Primary Examiner, Art Unit 3745

Conferees:

/Edward K. Look/  
Supervisory Patent Examiner, Art Unit 3745

/Justine R Yu/  
Supervisory Patent Examiner, Art Unit 3771